

ONTARIO WATER RESOURCES COMMISSION

1970 cottage pollution control  
program, Steenburg Lake in County of  
Hastings.

n.d.

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ONTARIO DEPARTMENT OF HEALTH  
ONTARIO WATER RESOURCES COMMISSION  
STEENBURG LAKE

As a result of recommendations contained in the March, 1970, report on Environmental Management of Recreational Waters in Cottage Areas in Ontario, water quality surveys of Steenburg Lake located in the County of Hastings were conducted by staff of the Ontario Water Resources Commission's District Engineers Branch during the periods of July 26 to 29 and September 8 to 11, 1970.

Staff of the Ontario Department of Health's Public Health Engineering Service had performed investigations of the on-shore private sewage disposal systems prior to 1970. Corrections to those systems found to be polluting are now being carried out.

Thermal stratification, a natural occurrence in many lakes, was observed during the July survey in the north-west and north-east arms of the lake. However, thermally stratified waters were present only in the north-east arm during the September survey; the absence of stratification in the north-east arm is attributed to natural causes. Serious oxygen depletion in the waters below the thermocline (zone of rapid temperature change) occurred during both surveys in the north-west arm of the lake, with the dissolved oxygen content therein being well below the level designated by

the OWRC for the preservation of biological life. In contrast, however, the dissolved oxygen content was above the required level at all depths in the north-east arm of the lake.

The water met the OWRC bacteriological criteria for total body contact recreational use, with the maximum geometric mean densities during both surveys being well below the OWRC criteria. The location of sampling points as well as the bacteriological results are shown on the appended maps. It will be noted that, at many stations, a single value was used for each bacteriological indicator organism tested; this was possible since, according to the statistical evaluation performed by the OWRC's Bacteriology Branch, the bacterial densities at many of the stations were not significantly different from one another.

The surface chemical quality was generally uniform throughout the lake. A decrease in hardness occurred between surveys from approximately 75 ppm to 67 ppm, the latter value being approximately one-half that of Lake Ontario waters. Higher concentrations of nitrogen, phosphorus and iron present in waters below the thermocline in the north-west arm are attributed to the very low dissolved oxygen content. These nutrients will be mixed with the surface water during the fall turnover and may stimulate algae growth in subsequent years.

## BACTERIOLOGICAL INDICATOR ORGANISMS

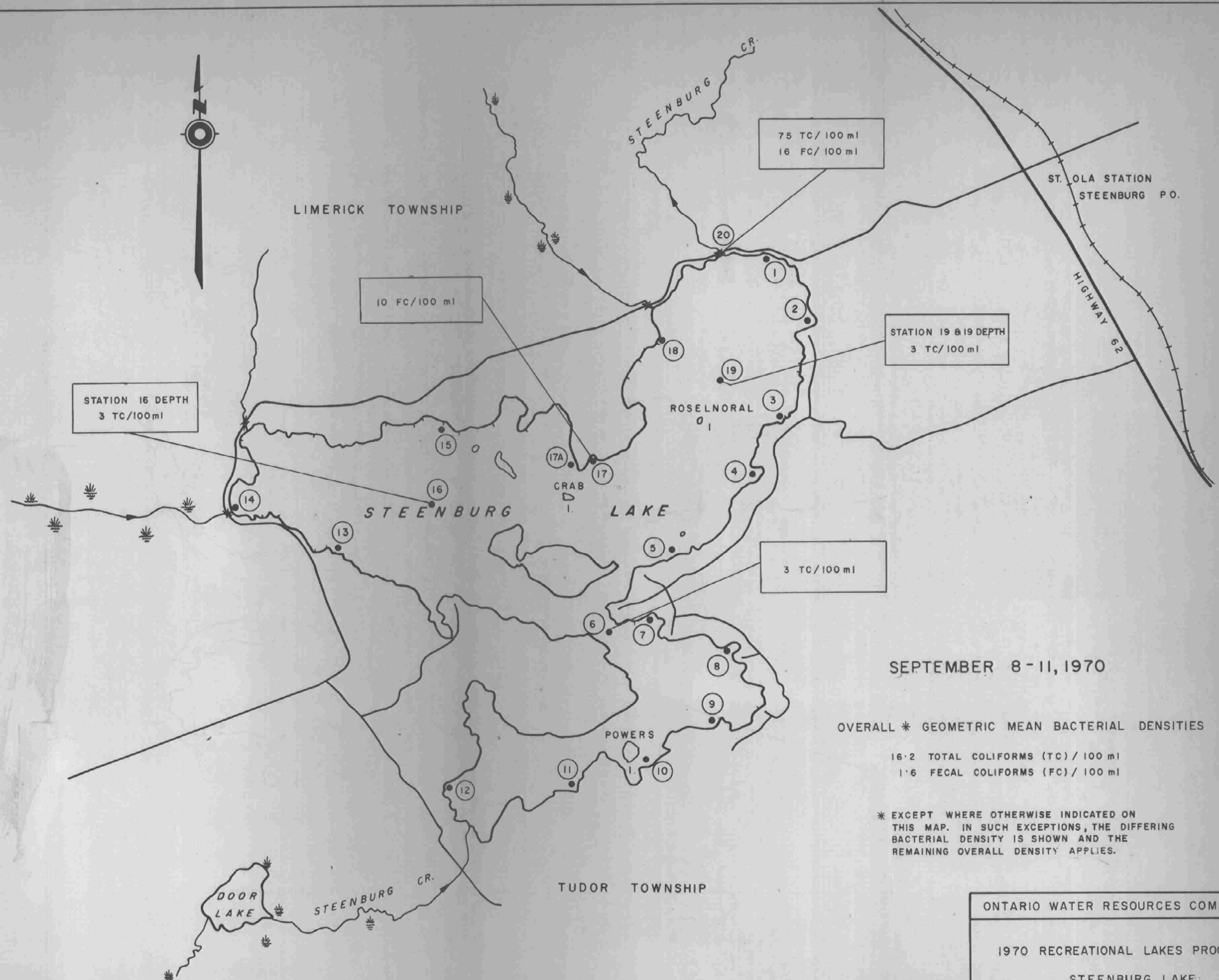
TOTAL COLIFORM organisms include a wide variety of bacteria ranging from the genus (group) Escherischia Coli (E. coli), which originate mainly in the intestines of man and other warm blooded animals, to the genera Citrobacter and Enterobacter aerogenes. The latter genera are basically found in soil but are also present in feces in small numbers. The presence of total coliforms in water may indicate soil run-off or, more important, less recent fecal pollution since organisms of the Enterobacter - Citrobacter groups tend to survive longer in water than do members of the Escherischia Coli group, and even to multiply when suitable environmental conditions exist.

The FECAL COLIFORM organisms are those coliform bacteria which are of intestinal origin and, therefore, are an indicator of recent fecal pollution. Most of the coliform bacteria found by the fecal coliform test are of the genus Escherichia Coli.

FECAL STREPTOCOCCI organisms are normal inhabitants of the large intestine of man and animals and generally do not multiply outside the human body. In waters polluted with fecal material, fecal streptococci are usually found along with fecal coliform bacteria but in smaller numbers. When the number of fecal streptococci bacteria approximates or is greater than the number of fecal coliform organisms, animals are the probable source.

The OWRC Guidelines and Criteria for Water Quality Management in Ontario (1970) indicate that water used for total body contact recreation can be considered impaired when the total coliform, fecal coliform, and/or fecal streptococcus geometric mean density exceeds 1000,100, and/or 20 per 100 ml, respectively.

NOTE: The term "geometric mean" refers to a type of average. Mathematically speaking, the geometric mean of a set of N numbers is the Nth root of the product of the numbers; in practice, it is computed by the use of logarithms.



SEPTEMBER 8-11, 1970

OVERALL \* GEOMETRIC MEAN BACTERIAL DENSITIES

16.2 TOTAL COLIFORMS (TC) / 100 ml  
1.6 FECAL COLIFORMS (FC) / 100 ml

\* EXCEPT WHERE OTHERWISE INDICATED ON THIS MAP. IN SUCH EXCEPTIONS, THE DIFFERING BACTERIAL DENSITY IS SHOWN AND THE REMAINING OVERALL DENSITY APPLIES.

ONTARIO WATER RESOURCES COMMISSION

1970 RECREATIONAL LAKES PROGRAM

STEENBURG LAKE

SCALE: AS SHOWN

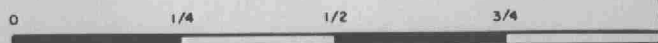
DRAWN BY: A.J.H.

CHECKED BY: R.C.M.

DATE: JULY, 1971

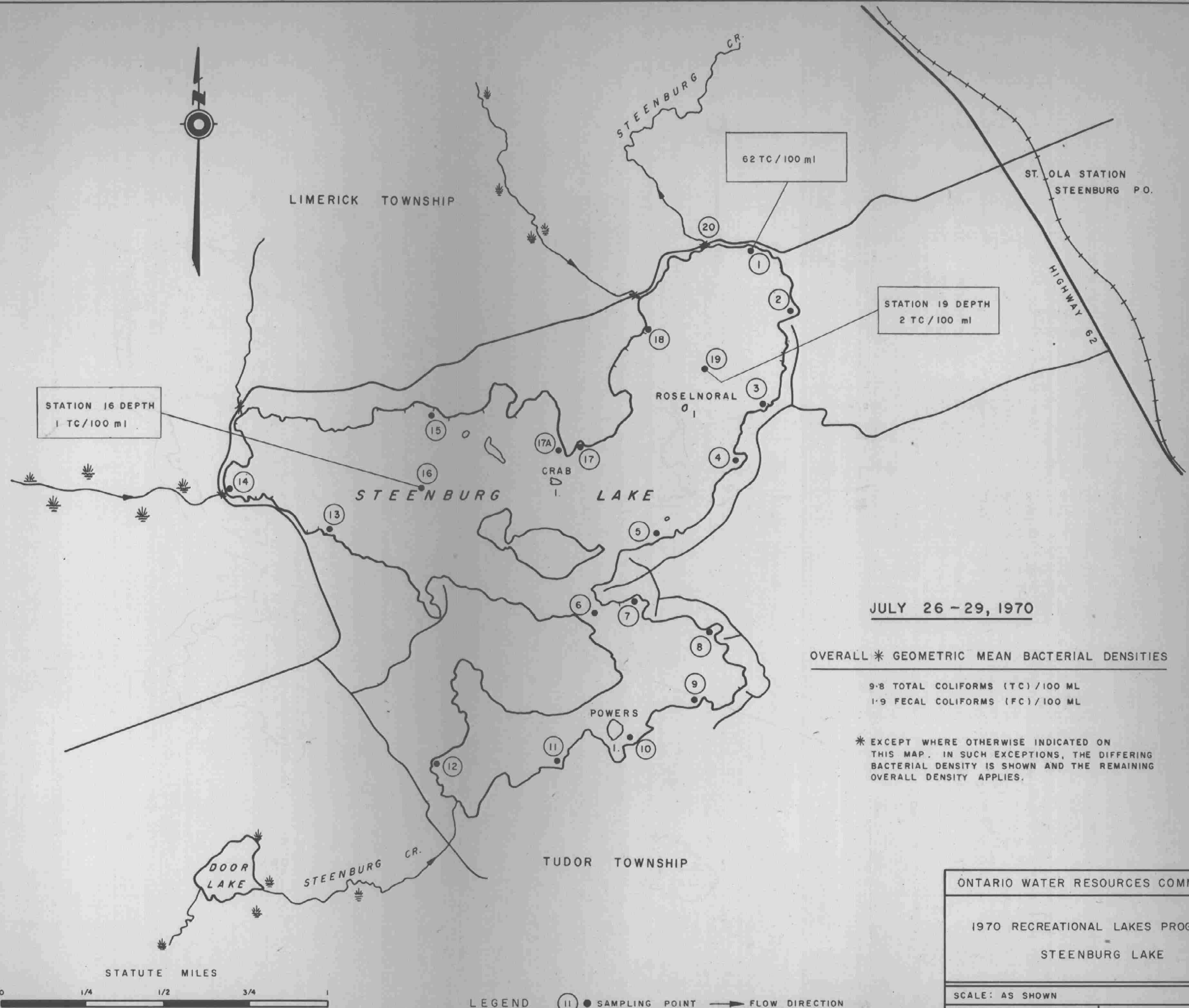
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STATUTE MILES



LEGEND

● SAMPLING POINT → FLOW DIRECTION



JULY 26 - 29, 1970

OVERALL \* GEOMETRIC MEAN BACTERIAL DENSITIES

9.8 TOTAL COLIFORMS (TC) / 100 ML  
1.9 FECAL COLIFORMS (FC) / 100 ML

\* EXCEPT WHERE OTHERWISE INDICATED ON THIS MAP, IN SUCH EXCEPTIONS, THE DIFFERING BACTERIAL DENSITY IS SHOWN AND THE REMAINING OVERALL DENSITY APPLIES.

ONTARIO WATER RESOURCES COMMISSION

1970 RECREATIONAL LAKES PROGRAM

STEENBURG LAKE

SCALE: AS SHOWN

DRAWN BY: A.J.H.

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LEGEND

● SAMPLING POINT → FLOW DIRECTION